

REMARKS

In the Office Action dated May 17, 2005, the Examiner stated Figure 9 is not referred to in the detailed description, and the Examiner suggested making an insertion in the first paragraph on page 20 to refer to Figure 9. Applicant notes that Figure 9 is, in fact, referred to in the next paragraph on page 20 (the paragraph beginning "Insofar as the deviations..."), but Applicant has no objection to also referring to Figure 9 in the paragraph noted by the Examiner, and accordingly that paragraph has been editorially amended. No new matter is added thereby.

The Examiner further noted the inadvertent retention of the word "tomograph" at several locations on page 23, whereas the word "scanner" was used at all other locations. Page 23 has been editorially amended to consistently use the term "scanner" to refer to the component having reference numeral 2.

The Examiner also noted an informality in claim 2. In Amendment "A" Prior to Action, it was Applicant's intention to amend claim 2 to delete the word "position" as in all of the other claims, however, this was inadvertently not done in claim 2 in the form presented in Amendment "A" Prior to Action. Claim 2 has accordingly been amended as originally intended.

Additionally, editorial amendments have been made in claim 18 to clarify the distinction between the functions of the control computer relating to operating the magnetic resonance scanner, and the functions that are actually performed by or in the control computer itself. Claim 18 is thus consistent with claim 19.

Claims 1-4, 8, 9 and 11-19 were rejected under 35 U.S.C. §102(e) as being anticipated by Mills. Claims 5 and 6 were rejected under 35 U.S.C. §103(a) as being

unpatentable over Mills. Claims 7 and 10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Mills, further in view of Frahm et al.

These rejections are respectfully traversed for the following reasons.

Independent claims 1, 18 and 19 as originally filed were intended to mean that the field strength that is determined from the phase of the magnetic resonance signal is the field strength of the field that is emitted by the antenna of the magnetic resonance examination apparatus, not the radio-frequency field that is associated with the magnetic resonance signal that is emitted from the examination subject. This was the intended meaning of the phrase in each of the independent claims "generating a radio-frequency field having a field strength associated therewith by emitting at least one radio-frequency pulse from said antenna."

In the Mills reference, there is no measurement or determination that is made of any type of the field strength of the radio-frequency field that is emitted by a radio-frequency antenna. The passage cited by the Examiner in substantiating the anticipation rejection based on the Mills reference all relate to detection or measurement of the magnetic resonance signal. There is no disclosure or suggestion in the Mills reference to determine the strength of the radio-frequency field that is emitted by the RF antenna, and in particular there is no determination of that field strength that is made based on the received or detected magnetic resonance signal.

In the detailed substantiation of the anticipation rejection of claim 1, the Examiner cited several passages in the Mills reference as allegedly corresponding to the step of "determining a phase of said magnetic resonance signal and, from said phase, determining said field strength." As noted above, "said field strength" in this

phrase was intended to mean the field strength of the radio-frequency field that is emitted by the RF antenna, and not the field strength of the magnetic resonance signal itself. The passages cited by the Examiner all refer to detection or analysis of the magnetic resonance signal. Even if the Examiner considered the “field strength” in the aforementioned language from claim 1 to refer to the field strength of the magnetic resonance signal, there still is no teaching in the Mills reference to determine the field strength of the magnetic resonance signal from the phase of the magnetic resonance signal.

Paragraph [0014] of the Mills reference states that the “superposition of external RF fields *produced by all of the voxels of the body* creates the total external RF field at each detector...”. Therefore, passage is referring to the RF field emitted by excited nuclei in the body, not the RF field emitted by the RF antenna.

The same is true of paragraph [0016] which refers to “the transverse RF magnetic field of each voxel” and also refers to “the detected RF signal”, meaning the detected MR signal.

Equations (3) and (4) at page 4 of the Mills reference refer to magnetic fields generated by an object such as a phantom, which is stated immediately above those equations to be represented as “a series of magnetic dipoles centered on volume elements 302 of the magnetized material.” The reference to the “magnetized material” makes clear that these equations are again referring to the fields (or simulations of those fields) generated by the object under examination, and do not refer to fields (or the strength of fields) emitted by the RF antenna.

Paragraph [0042] explicitly refers to “the RF NMR signal.”

Paragraph [0078] again refers to the unique spatial distribution of magnetic dipoles giving rise to a unique magnetic field, and it is this “measured external RF field” that is being discussed in this paragraph, namely the RF field originating from the object under examination.

Paragraphs [0100] and [0101] refer to “nuclei placed in a static magnetic field H_0 , and then subjected to an additional rotating (RF) field H_1 , and later refer to “the RF emitting voxel.” The reference in paragraph [0100] to “the measurement of the intensity of the RF signal” is stated to follow T_1 and/or T_2 encoding pulses, again making clear that it is the magnetic resonance signal itself, originating from the examination subject that is referred to as the “RF signal.”

The same is to regarding the detailed explanation at page 7, paragraph [0073] through page 25, paragraph [0230] of the Mills reference.

Therefore, all of the passages cited by the Examiner in the Office Action regarding the last step of claim 1 refer to detection of the MR signal itself, and have nothing to do with making any determination as to the field strength of the radio-frequency field emitted by the radio-frequency antenna.

It is possible that in the independent claims the Examiner considered the original language of the independent claims of “generating a radio-frequency field having a field strength associated therewith” as encompassing either or both of the radio-frequency field associated with the radio-frequency pulse that is emitted by the radio-frequency antenna, and the radio-frequency field that is associated with the magnetic resonance signal that originates from the examination subject. In order to preclude such an overbroad interpretation, which was not the interpretation of those claims intended by the Applicant, each of the independent claims has been amended

to make clear that it is the field strength of the antenna-emitted radio-frequency field that is being determined from the phase of the magnetic resonance signal.

No such method or magnetic resonance examination apparatus or computer program product is disclosed in the Mills reference wherein the field strength of the antenna-emitted radio-frequency field is detected or determined in any manner, much less from the phase of the magnetic resonance signal. None of those independent claims, therefore, is anticipated by Mills.

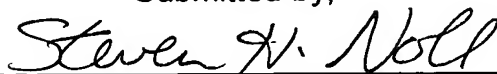
Claims 2-4, 8, 9 and 11-17 add further steps to the novel method of claim 1, and therefore are not anticipated by the Mills reference for the same reasons discussed above in connection with claim 1.

As to claims 5 and 6, in view of the complete absence of any teaching whatsoever in the Mills reference to determine or detect the antenna-emitted radio-frequency field, it would not have been obvious to a person of ordinary skill in the field of magnetic resonance imaging to modify the Mills reference to arrive at the subject matter of claims 5 and 6, which embody the subject matter of independent claim 1 therein. Claims 5 and 6, therefore, would not have been obvious to such a person under the provisions of 35 U.S.C. §103(a) based on the teachings of Mills.

As to claims 7 and 10, even if the Mills reference were modified in accordance with the teachings of Frahm et al., the subject matter of claims 7 and 10, which embody the subject matter of claim 1 therein, still would not arise. Claims 7 and 10, therefore would not have been obvious to a person of ordinary skill in the field of magnetic resonance imaging under the provisions of 35 U.S.C. §103(a) based on the teachings of Mills and Frahm et al.

For the foregoing reasons, all claims of the application are submitted to be in condition for allowance, and early reconsideration of the application is respectfully requested.

Submitted by,



(Reg. 28,982)

SCHIFF, HARDIN LLP
CUSTOMER NO. 26574

Patent Department
6600 Sears Tower
233 South Wacker Drive
Chicago, Illinois 60606
Telephone: 312/258-5790
Attorneys for Applicants.

CH1\ 4311749.1